

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
WASHINGTON, D.C.

and

BEET SUGAR DEVELOPMENT FOUNDATION
DENVER, COLORADO

and

MICHIGAN AGRICULTURAL EXPERIMENT STATION
MICHIGAN STATE UNIVERSITY
EAST LANSING, MICHIGAN

NOTICE OF RELEASE OF EXPERIMENTAL SUGARBEET GERMPLASM EL-X3 WITH WILD
ANCESTRY AND SELECTION FOR APHANOMYCES RESISTANCE

The Agricultural Research Service of the U. S. Department of Agriculture, the Beet Sugar Development Foundation, and Michigan State University announce the joint release of experimental sugarbeet germplasm EL-X3. This experimental germplasm was last selected at the Betaseed, Inc. Aphanomyces nursery in Shakopee, MN in 2003 by Margaret Rekoske and Jay Miller, followed by seed production at Shakopee, MN in 2004. The derivation of this material has the goal of understanding and broadening the genetic base for Aphanomyces resistance in sugar beet. This line may be useful for a number of basic and applied investigations, and limited quantities of seed are available to facilitate further testing and development of these and additional goals, since wild beet germplasm has been used in its development.

Construction and evaluation of original and derived materials was done in the program of J. Mitchell McGrath, USDA-ARS East Lansing, MI beginning in 1997. This line is not currently suitable for variety development since it still has many characteristics of wild materials; however, it has some improvement in taproot characteristics relative to the wild accession. In 2003, 64 genetically similar entries, standards and the sugarbeet parents were tested in the Shakopee Aphanomyces nursery and rated on a 1 (resistant) to 9 (susceptible) scale. The average rating of two Aphanomyces tolerant and two susceptible standards was 2.0 and 7.0, respectively (LSD_{0.05}=1.83, average of two late readings), the sugar beet parents SP6822 and 6869 had scores of 1.0 and 5.5, respectively, and EL-X3 scored 4.0. From this nursery in 2003, approximately 20 roots were selected for improved root conformation and relative freedom from disease from within each release. Subsequently seed of each release was produced by inter-pollination of the selected plants the following year.


The wild beet parent of EL-X3 is WB185 (PI 546409), collected near Plymouth, England. WB185 is diploid, biennial, and prostrate, with reported resistance to Cercospora leaf spot and Polymyxa betae. It was used because its potential resistance to Aphanomyces diseases caused by Aphanomyces cochlidioides was evident by having a disease score of 1.0 (resistant) (rating system of 0-9 scale with 0 showing no symptoms and 9 being dead) in the 1994 Beta germplasm evaluation nursery conducted by C.M. Rush in Amarillo, Texas (Sugarbeet.Aphan.94.Rush; <http://www.ars-grin.gov/cgi-bin/npgs/html/eval.pl?269>). Susceptible sugar beet 6869 (a progenitor of C869, PI 628754) was used as the sugar beet parent, and as a donor of the self-fertility (Sf) and nuclear male sterility characters. This release is expected to be self-fertile and segregating for nuclear male sterility. Tested seed was harvested from the sugar beet parent.


EL-X3 (4PS1928) was constructed from a cross between single plants of WB185 and 6869, and F1 seed was planted in the Saginaw observation nursery. 21 plants were selected for vigor, and self-pollinated in the greenhouse to produce S2 seed. S2 seed of these 21 lines was combined and grown in the 2003 Aphanomyces nursery in Shakopee. Plants with reasonably evident taproots and few disease symptoms were selected and increased in Shakopee.

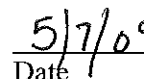
These EL-X (for experimental) lines are being released as germplasm resources for breeders to use in developing parental lines with potentially new sources of resistance to diseases caused by Aphanomyces and other potential traits. These lines also contain a series of useful characters at low allele frequencies derived from the parent's components, such as those necessary to breed for seed parents used to create cytoplasmic male sterility-mediated hybrids. Seed will be available for use by writing to Dr. J. Mitchell McGrath, USDA-ARS, 494 PSSB, Michigan State University, East Lansing, MI 48824-1325 (mitch.mcgrath@ars.usda.gov). Genetic material of this release will be deposited in the National Plant Germplasm System where it will be available for research purposes, including development and commercialization of new cultivars. Efforts of Yi Yu, Tim Duckert, and Teresa Koppin as well as Betaseed, Inc. in generating these materials are gratefully acknowledged. It is requested that the author be notified if this germplasm contributes to the development of a new breeding line or cultivar. U.S. Plant Variety Protection will not be requested.

Signatures:

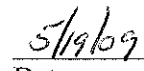

Executive Vice President
Beet Sugar Development Foundation


Date


Director, Michigan Agricultural Experiment Station
Michigan State University


Date


Deputy Administrator, Crop Production and Protection
Agricultural Research Service, U.S. Department of Agriculture


Date